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The focus of this project was student exploration and student directed learning. We requested computer equipment and software to support a mathematics classroom with computers on the periphery. The room now have a variety of uses:

Classroom Use: It is an interactive classroom in which mathematics is taught. Class time is a mixture of lecture, demonstrations, and student exploration. The computers allow conjectures to be tested with numerous examples in an efficient manner. Students see mathematics from numerical, graphical, and symbolic points of view.

Open Use: Building on the knowledge and skills gained in the interactive classroom setting, teachers of upper level mathematics courses and other upper level science courses assign homework, projects, and open ended questions for which the students use technology as an additional means of exploration.

Use for Faculty and Student Research: The nurturing environment at the University of the Virgin Islands has led to many faculty directed undergraduate student research projects. The availability of the computer classroom has expanded this tradition. The computer classroom workshop has provided a means of creating and testing physical models.

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An Interactive Computer Classroom

The Division of Science and Mathematics have benefited from the availability of the *Interactive Computer Classroom* in many ways, and across disciplines. The room is used mainly by students and faculty in the mathematics disciplines, but has also been used by biologists. The benefits are outlined below.

SHORT TERM GOALS

1 Increased student directed exploration:

Mathematics instructors have encouraged students to investigate and question the ideas that arise in mathematics. The precedent for this project lies in the successful mathematics programs that have already instituted this practice. In Models that Work--Case Studies in Effective Undergraduate Mathematics Programs, published by the Mathematical Association of America (MAA), we find evidence of highly successful programs that use technology in various ways. Calculus reform calls for the students to be more active learners. The 1995 MAA report, Assessing Calculus Reform Efforts (ACRE), concluded that encouraging active learning increased interest in mathematics. Here at the University of the Virgin Islands we have successfully used the *Interactive Computer Classroom* for classes in Calculus, Numerical Analysis, Mathematical Modeling, Statistics, Differential Equations and Linear Algebra. The course in Mathematical Modeling would have been difficult without the availability of the classroom. During class, students were able to construct models and test their conjectures immediately. The class centered around projects which the students worked on in and out of class. Technology was an integral part of their work. Similar situations exist in other courses.

Building on these and other experiences in the division of science and mathematics, a grant was submitted to the National Science Foundation entitled *Research Throughout the Curriculum*. Through this endeavor, we aim to incorporate research into the science and mathematics courses, and more student directed explorations. The availability of the *Interactive Computer Classroom* will allow the mathematics discipline to fully participate in this endeavor.

2 Increase the number of mathematics and science majors:
In many institutions that adopted some of the Calculus reform techniques, there were more students taking advanced mathematics courses, and an increase in the number of mathematics majors. At St. Olaf College where 10 to 15 percent of the graduates are mathematics majors, it was noted that their "course in linear algebra, taught with a strong component of technology, is a key ingredient in encouraging students to major in mathematics". As outlined in *Models that Work: Case Studies in Effective Undergraduate Programs*, the use of technology in the teaching of mathematics is not only widespread, but also seen as a success. We hope to duplicate these successes.

The nurturing environment of UVI and the size of the mathematics classes set the stage for a "model that works". The one on one student-faculty interaction that an *Interactive Computer Classroom* facilitates will encourage more of our students to choose a major in mathematics. The use of technology will, of course, be complemented by other methods of instruction, including group projects, writing assignments, and open ended questions. Coupled with the recent revision of the mathematics curriculum, the total incorporation of technology will revitalize the mathematics faculty and get the students excited about mathematics and the mathematics program, thus retaining our majors.

We expect that the focus on technology will also help in recruiting science and mathematics majors. We aim to eliminate the perception that up to date equipment can only be found in the halls of stateside schools. The *Interactive Computer Classroom* was used in a summer science enrichment program for graduating high school seniors. Many students expressed surprise at the fact that UVI had these capabilities. We know of three non-committed students who decided to attend UVI after their experience in the Summer Science Enrichment Program. Many cited their mathematics course as among the best, with Professor Robert Stolz winning the award for best summer professor.

3 Better prepare students for graduate schools:
The University of the Virgin Islands has a great record of sending many of its science majors on to graduate school in the sciences. This proposed project seeks to increase these numbers first by increasing the number of mathematics majors. It also aims to make these graduates in mathematics and the sciences more competitive for graduate school admission.

As the use of computer algebra systems (CAS) increases, we may find that mathematics, science and engineering graduate students without previous knowledge of a CAS are at a disadvantage. Their ability to be research assistants or teaching assistants might rely on this knowledge. Discussion at the first Conference for African American Researchers in the Mathematical Sciences in June, 1995 at Berkeley, centered around making sure that our students were well prepared for the rigors of graduate schools. Many of our African American graduate students find themselves under-prepared for the first year of graduate school and attrition is higher than acceptable. The incorporation of computers in their undergraduate careers will give them an edge in the tough first years. The emphasis on student directed exploration will make them better researchers.

Since using the *Interactive Computer Classroom*, UVI students who have participated in extramural summer research have indicated to us that they have used *Mathematica* in their summer projects. This meant that they were at an advantage for having been familiar with this software. This experience will undoubtedly continue into their graduate school experience. It is still too early to evaluate this.

LONG TERM GOALS

1. Increase the number of science majors entering UVI:
There is anecdotal information of students choosing to matriculate at the University of the Virgin Islands after participating in the UVI Summer Science Enrichment Program. The quality of the instruction in this program is greatly enhanced by the availability of the *Interactive Computer Classroom*. This summer (2000) high school sophomores and juniors will be included in the summer program for the first time. In the past, most of the seniors who have attended already knew their college plans. These are students who are at the top of their high school classes. Therefore, the fact that some have decided to come to UVI after attendance at this summer program is commendable. We expect to see an increase in the students who are interested in science choosing to attend UVI. The *Interactive Computer Classroom* will be used extensively in the upcoming summer program as students work on projects pertaining to environmental issues.

2. Run technology clinics for the elementary and high school teachers of mathematics:

This goal has yet to be realized using the new facilities. There have been similar endeavors in the past, and we plan to work with the Virgin Islands Department of Education to do similar programs this summer (2000).

3. Parallel Computing Capabilities:

Presently, the classroom, is being used to experiment with parallel computing capabilities. "Beowulf" type parallel processing systems are being configured using the computers. This does not impede the classroom use as the parallel computing will occur when the classroom is not in use.

Dissemination:

The principal investigators, Robert Stolz, Ph.D. and Camille A. McKayle, Ph.D. informed the larger mathematics community of the project through a poster presentation at the January, 2000 Joint Meetings of the American Mathematical Society and the Mathematical Association of America (Washington, D.C.). The poster outlined, with pictures, the design of the room, as well as its uses.

Summary:

Through the DOD infrastructure program for HBCU/MI, an *Interactive Computer Classroom* was created. This enabled us to enhance teaching in mathematics thus upgrading the quality of all science programs by producing more technologically capable science students. Students are provided with a more intellectually stimulating learning environment and many have used *Mathematica* for other purposes after being introduced to this computer algebra system in their mathematics classes.